ASPECTS OF THE WEED COMPONENT OF THE SPONTANEOUS VASCULAR FLORA OF MCDONOUGH COUNTY, ILLINOIS

R. D. Henry
The R. M. Myers and A. L. Kibbe Herbaria
Western Illinois University, Macomb, 61455

ABSTRACT: There are 310 weed species in the spontaneous vascular flora of McDonough County, Illinois, of which 38% are alien and 62% native. The weed species represent 29% of the county vascular flora and 70% of the Illinois vascular weed species. Of the alien species 47% were once cultivated, 82% are from the old world, 62% were in the county before 1956 and between 1833-1982 about one species was introduced per year. The weed species are about 1.3% pteridophytes, 0.3% gymnosperms and 98.4% angiosperms occurring in 59 families and 162 genera. Of the weed species 80% are herbaceous, 40% poisonous to humans, 14% poisonous to livestock, 27% are drug plants, 91% terrestrial, 36% annual and 59% perennial. It is suggested that the weed component of the county's dynamic flora and ecosystem be continually evaluated and managed so as to minimize ecological disruption.

INTRODUCTION

The importance of weeds to mankind in that they reduce yields in agricultural systems has been often documented (Batra 1982, Boyer 1982, Holm 1969). It is therefore important for the understanding and management of them that the kinds of weeds present and their characteristics be continually monitored. Myers (1972) in his catalog of the Illinois vascular flora annotated the weeds of the state and of McDonough County. Henry (1983c) discussed and updated the number of species in the Illinois weed flora. This paper endeavors to present a floristic profile of the current weed component of the spontaneous vascular flora of McDonough County, Illinois.

METHODS

The list of weeds used for this analysis (Henry 1983b) was derived by noting which plants in the present-day vascular flora of McDonough County, Illinois (Henry 1982), are weeds in the spontaneous vascular flora of Illinois (Henry 1983a). Family and species nomenclature follow Mohlenbrock (1975).

RESULTS

1. The Alien and Native Weed Species

There are 310 vascular plant weed species which represent 29.2% of the present-day species in the McDonough County spontaneous vascular

flora. These weed species are 70.1% of the weed species in the Illinois flora. Of the 310 weed species 117 (37.7%) are alien and 193 (62.3%) are native species. Five (Ambrosia artemiisifolia, A. trifida, Cannabis sativa, Cirsium arvense, Sorghum halepense (1.6%) are on the official noxious weed list of Illinois (Ill. Dept. of Agric. 1978). Of Williams' (1980) thirty-seven purposefully introduced plants into the United States that have become noxious or poisonous weeds, seven (2.3%) are weeds in McDonough County (Cannabis sativa, Cynodon dactylon, Datura stramonium, Kochia scoparia, Linaria vulgaris, Lonicera japonica, Sorghum halepense). Of Holm's (1969) ten worst weeds in the world, four (1.3%) (Cynodon dactylon, Echinochloa pungens, Eleusine indica, Sorghum halepense), three of which are aliens, are weeds in the county.

2. Analysis of the Alien Weed Species

Of the 117 alien weed species 55 (47%) were once cultivated plants. Most of these species are from the old world (82.1%) while the fewest are from the United States outside of Illinois (8.5%) (6.8% from the west and 1.7% from the southwest). The rest (9.4%) are from the New World topics. Based on data from Jones and Fuller (1955) and Myers (1983) 73 (62.4%) of the alien weed species were in the McDonough County flora before 1956 and 44 (37.6%) arrived in the flora from 1956-1982. Thus the number of alien weed species introduced per year from about 1833-1955 was 0.59, between 1956-1982 was 1.69 and between about 1833-1982 was 0.79. The relatively large species increase per year between 1956-1982 perhaps is due to the large increase of woody weed species during that time period as indicated by the fact that in Illinois in 1954 there were only four listed species of woody weeds whereas in 1982 there were 116 species (Henry 1983c). Since plant collections from McDonough County have been made only in relatively recent times (none before 1945 per Myers 1972 p. 58), it would seem reasonable to assume that perhaps the figures for the actual number and percentage of alien weed species in the flora before 1956 are lower than may have actually been the case.

3. Taxonomic Distribution of the Weed Species

The weed species occur in four divisions: three (1%) in the Equisetophyta, one (0.3%) in the Polypodiophyta, one (0.3%) in the Pinophyta and 305 (98.4%) in the Magnoliophyta. Therefore four (1.3%) are pteridophytes, one (0.3%) gymnosperm and 305 (98.4%) are angiosperms. Of the angiosperms 55 (18%) are Liliopsida (monocots) and 250 (82%) are Magnoliopsida (dicots). The monocots represent 17.7% of the total weed flora species whereas the dicots compose 80.6%.

The weed species occur in 59 families. One (1.7%) belongs to the Equisetophyta, one (1.7%) is in the Polypodiophyta, one (1.7%) in the Pinophyta and 56 (94.9%) are Magnoliophyta. Thus the weed families

are about 3% pteridophytes, 2% gymnosperms and 95% angiosperms. Within the angiosperms nine (16.1%) are Liliopsida and 47 (83.9%) are Magnoliopsida. The monocots represent 15.3% of the total weed flora families whereas the dicots comprise 79.7%. The largest weed families are Compositae (59 species); Poaceae (Gramineae) (32); Cruciferae, Rosaceae and Polygonaceae each with 13 species; Fagaceae (10); and the Labiatae and Cyperaceae with nine species each.

The weed species occur in 162 genera. One (0.6%) belongs to the Equisetophyta, one (0.6%) to the Polypodiophyta, one (0.6%) to the Pinophyta and 159 (98.2%) to the Magnoliophyta. Thus the weed genera are about 1.2% pteridophytes, 0.6% gymnosperms and 98.2% angiosperms. Within the angiosperms 30 (18.9%) are Liliopsida and 129 (81.1%) are Magnoliopsida. The monocots represent 18.5% of the total weed flora genera and the dicots 79.6%. The largest genera in the weed flora are Polygonum (10 species), Quercus (10), Amaranthus (7), Solidago (6), Eupatorium (6), Erigeron (6), Bidens (6), Scirpus (6), Carya (5) and Potamogeton (5).

4. Woody and Herbaceous Habit of the Weed Species

Of the weed species 62 (20%) are woody and 248 (80%) are herbaceous. Of the woody species 12.9% (8) are alien and 87.1% (54) are native whereas the herbaceous species are 44% (109) alien and 56% (139) are native. All of the pteridophytes are herbaceous, all of the gymnosperms woody and of the angiosperms 61 (20%) are woody and 244 (80%) are herbaceous. Of the angiosperm weed families 15 (26.8%) are woody and 44 (78.6%) are herbaceous (the total is over 56 and 100% due to the presence of both woody and herbaceous species in three families: Rosaceae, Rubiaceae and Leguminosae). Of all the weed families 46 (78%) are herbaceous and 16 (27%) are woody (the total is over 59 and 100% due to three families (Rosaceae, Rubiaceae, Leguminosae) having both woody and herbaceous species). Of all the weed genera 135 (83.3%) are herbaceous and 27 (16.7%) are woody. The largest herbaceous weed families are Compositae (59 species), Poaceae (32), Cruciferae (13), Polygonaceae (13), Labiatae (9), Cyperaceae (9), Convolvulaceae (8), and Solanaceae (8). The largest woody weed families are Fagaceae (10 species), Rosaceae (10) Salicaceae (7), Anacardiaceae (5), Juglandaceae (5), Ulmaceae (4), Moraceae (4), Aceraceae (4), and Caprifoliaceae (3). The largest herbaceous weed genera are Polygonum (10 species), Amaranthus (7), Solidago (6), Eupatorium (6), Erigeron (6), Bidens (6), Scirpus (6), Potamogeton (5), Verbena (4), Solanum (4), Setaria (4), and Aster (4). The largest woody weed genera are Quercus (10 species), Carya (5), Rhus (4), Populus (4), Acer (4), Rubus (4), Prunus (3), Salix (3), Ulmus (3), Fraxinus (2), Morus (2), Rosa (2) and Vitis (2).

5. Poisonous Weed Species

Of the weed species 124 (40%) are poisonous to humans and 44 (14.2%) are poisonous to livestock. Plants poisonous to humans were

determined from Hardin and Arena (1974) and for livestock from Evers and Link (1972).

6. Drug Plant Weed Species

Eighty-two (26.5%) of the weed species were on Tehon's (1951) list of Illinois drug plants.

7. Habitat of the Weed Species

Of the weed species 29 (9.4%) are aquatic and 281 (90.6%) are terrestrial.

8. Duration of the Weed Species

Of the weed species 112 (36.1%) are annual, 16 (5.2%) are biennial and 182 (58.7%) are perennial.

DISCUSSION

Myers (1972) annotated over 200 vascular plant weed species in Illinois and over 150 in McDonough County. This represented the first list of weeds for the county. Henry (1983b) recorded 310 weed species in the county. From the perspective of studying trends and changes of this dynamic weed flora it would be desirable to compare Myers' and Henry's data but unfortunately such a direct comparison would not be accurate since Myers' list is based on only the native and naturalized alien vascular flora whereas Henry considered the entire spontaneous vascular flora. Thus the apparent doubling of the weed species in eleven years indicated above is not considered accurate.

McDonough County presently has 70% of the Illinois weed species. The county weed flora is about 38% alien species and 62% native species which is nearly the same as for the Illinois weed flora. As is also true of the state weed flora, slightly less than one-half of the alien weed species were once cultivated and about four-fifths immigrated from the old world. The present-day weed flora of the county consists of 62 (20%) species of woody plants which is less than the 26% that compose the state's weed species. It is to be noted that Myers in 1972 listed only eight woody species (four native and four alien) in the weed flora whereas Henry in 1983 listed 62. This large increase reflects the fact that woody plants (particularly native species) have become major weeds only in the last several decades (see Henry 1983c). A much larger proportion (87%) of the woody weed species are native than are herbaceous weed species (56%).

The list of weeds for McDonough County which was used for this analysis (Henry 1983b) is accurate on the basis of it being compiled from current published professional data. A local newspaper, however, recently (Anonymous 1983) noted that corn (as a volunteer in

soybeans) could be abundant and a potential weed problem in McDonough County in 1983 and that a weed control specialist would discuss it. This weed (corn) is not in the publications referred to above (and referenced in the introduction) showing that there probably will always be some difference of opinion as to what plants are weeds and that there is always a constant need to reevaluate weed lists.

Weeds are part of the flora and thus their management affects the ecosystem in which they are present. Weed management (control) utilizes procedures which reduce or eliminate those plants. Hopefully, a judicious ecological judgement would be made on procedures to be used and on which and how many of these plants are involved in this manipulation to favor some plants over others. Perhaps, a "weed" environmental impact statement would be desirable to evaluate, minimize and, if necessary, suggest mitigation when the ecosystem is in danger of harmful disturbance. Some methods that could be considered so as to minimize ecological disruption are: (1) increase the use of selective herbicides and decrease the use of nonselective ones (develop herbicides that are more selective among the weeds themselves; these herbicides should affect only the plants that are weeds in any given situation), (2) encourage using the weeds in an integral and positive helpful way in pest management systems (for an example see Illinois Natural History Survey (1983)), and (3) use an alternative production system such as managed natural system production that would be equal to or greater than present monocultural production systems. Weeds can also be valuable as a source of desirable genes in production systems and a potential economic and useful resource for mankind.

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